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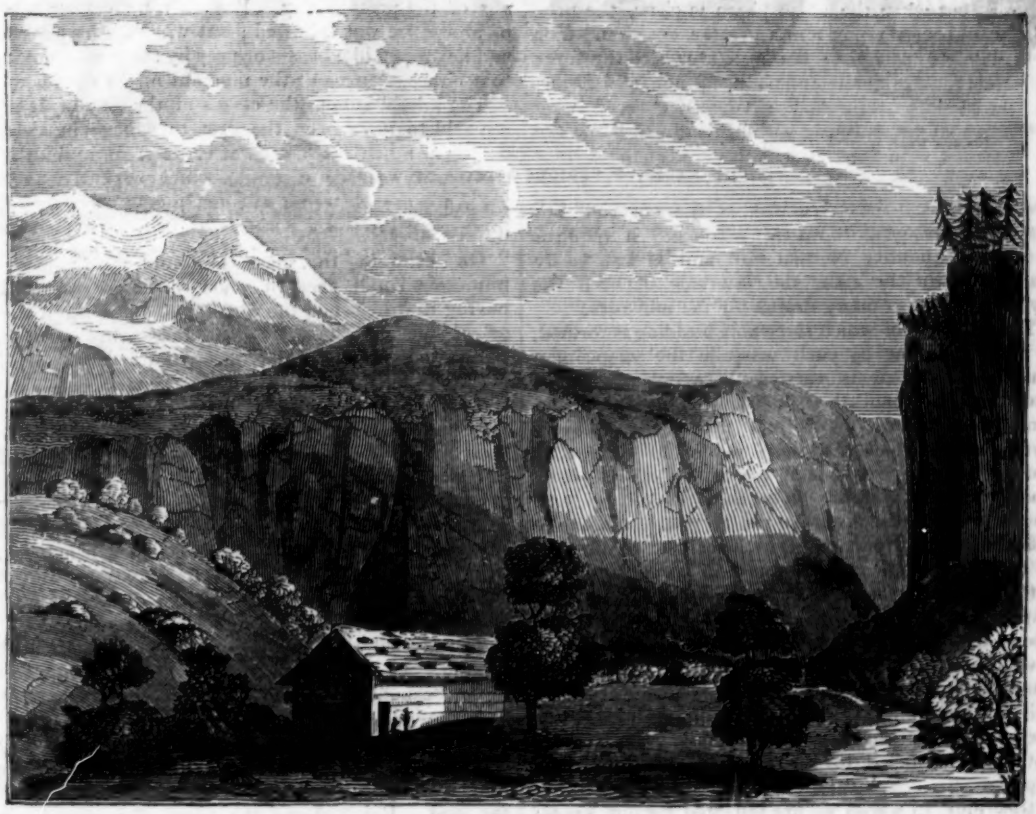
THE BERNESE OBERLAND.



JUNGFRAU AND WENGEN ALPS.

THE Canton of Berne, though not one of the three great founders of Swiss independence, is the second in rank in the Helvetic confederation, and by far the first in size, wealth, and power. It comprises within its northern and western boundary part of the Jura, and in its southern and eastern some of the most remarkable of the Alpine chain, the intermediate space consisting of pastoral lowlands, a region of surpassing beauty, which is, however, nearly overlooked in contemplating the stupendous magnificence of the surrounding objects. That part of the High Alps which is included in the Canton of Berne, is usually known by the name of the Oberland, or Highland, of Berne, and of this we propose to give some account.

The Bernese Oberland, then, consists principally of four great valleys, the waters of which are emptied into the common basin of the lake of Thun. The most western, and perhaps the least remarkable of these valleys, is the Simmenthal, which separates the chain of the Stokhorn from that of the Niesen. The second, parallel to the Simmenthal, is the Kanduthal, which rises at the foot of the Gemmi-pass in the Valais. These two valleys pour their united waters into the western side of the lake of Thun, where they form a landscape of meadows of the richest verdure, interspersed with the most picturesque villages. The two other valleys empty themselves into the eastern corner of the lake, and of these, and the surrounding mountains, the Oberland properly consists. The principal of them is the valley of Hasli, which follows the course of the Aar from its source, the other consists of the united valleys of Grindelwald and Lauterbrunnen. Nowhere has nature displayed more magnificence than in this extraordinary region; nowhere can so constant a succession of rock, waterfall, or glacier, be found: the mind, hurried on from one wonder to another, is at first lost in a breathless enchantment, and it requires a continued residence among them to be able to appreciate them thoroughly.

The grand features of these valleys are the mighty granite mountains which encompass them; of which the most remarkable are the following:—

	Feet.
The Finster Aar horn (Dark Horn of the Aar)	14,300
— Jungfrau (Virgin)	13,600
— Eiger	12,900
— Wetterhorn (Peak of Thunder)	12,000
— Schreckhorn (Peak of Terror)	13,200

Besides which, there are many but little inferior in height or sublimity.

The valley of Lauterbrunnen, with its celebrated cascade, the Staubbach, has been already described in the *Saturday Magazine*, Vol. VII., p. 162, we will, therefore, proceed to the valley of Grindelwald, which, though of a somewhat different character, offers even greater beauties and wonders to the traveller. The usual access to it is by the valley of Lütschenen, but the route from Lauterbrunnen by the Wengern Alp, is much the most alluring to the lover of the sublime. The Wengern Alp is opposite to the Staubbach, and it requires two hours' hard labour to attain its summit, but when the atmosphere is clear, the prospect would well repay much greater exertion. For immediately opposite to the spectator rise the three enormous masses of the Jungfrau, Moneh, and Eiger, (the most imposing of the three,) covered with eternal ice, and apparently within his grasp, while the ear is struck with the frequent thunder of the distant avalanche. The effect of an avalanche is much greater to the ear than to the eye, as should the eye happen to catch it, the appearance (unless it is very near indeed,) is precisely that of falling water, whereas the sound, reverberated from a thousand rocks and caverns, is wonderfully awful and sublime.

Till lately, the Jungfrau was thought to be inaccessible, but in 1828, after several ineffectual attempts, a party of Grindelwald chamois-hunters succeeded in attaining the summit, with considerable difficulty and danger. They described the area of the summit as about thirty or forty feet in diameter, and the vast glacier, or rather plain of ice, which reaches from the Bernese Mountains to those of the Valais, as much more extensive than was supposed before. This tremendous phenomenon, must be twenty-five miles in length, by from three to twelve broad.

From the Wengern Alp to Grindelwald, the descent is over the Little Scheideck, on which may be observed the terrible effect of a glacier which fell about twelve years ago. It has been thought that forests were a complete protection against the progress of glaciers, but in the present instance the trees were entirely swept away before the moving mass, while in those parts where it did not touch, the mountain-side is still covered with magnificent pines.

The principal objects of curiosity at Grindelwald are the glaciers, which are well worthy of a visit, and, indeed, are more easily attained than any other in Switzerland. The finest and most delicate turf reaches nearly up to the ice, and wild strawberries and flowers may be gathered within a few yards of it. The principal branch of the Lütchine issues from a natural arch of ice at the foot of the glacier Inférieur, supplied by the constant melting of the ice above. The whole of this glacier is covered with pinnacles thirty or forty feet high, and is intersected with cracks and chasms, from which, in the year 1790, a fatal catastrophe occurred.

A Monsieur Monson, a pastor of the Pays de Vaud, visited the glacier with his guide, and having passed the lower part of it, proceeded to traverse the Mer de Glace. Having placed his "alpenstock" on the edge of one of the cracks, he leaned on it to contemplate the profound abyss, when suddenly the point of the staff slipped from under him, and he fell headlong into the gulf. The body was eventually recovered from the depth of 770 feet, so that consciousness must have ceased long before the unfortunate man reached the bottom.

There are many peculiar usages of the inhabitants of the valley of Grindelwald, of which some account shall be given in a future paper.

THE DUTCH WHALE FISHERY.

THE Whale fishery in Holland dates from the ninth century; and even earlier than that it seems to have been engaged in by the Norwegians. The Flemings of the eleventh, and the Icelanders and Normans of the twelfth century, also took part in it; but no authentic accounts remain of the manner in which it was conducted in those remote times. We know not even how the whales were killed; though we may conjecture that the practice in this respect may have resembled that of the Esquimaux and Aleoutians of the present day. Probably no certain mode of procedure was followed; but whales were attacked and destroyed like beasts of prey by the readiest means that circumstances at the moment might suggest.

The inhabitants of the coasts of the Bay of Biscay are said to have been the first to engage in Whale fishing as a distinct branch of commerce; and indeed, this hardly can be disputed, since so early as the twelfth century, traces of such a commerce may be discovered on those coasts. It is known also that whales used at one time to frequent the bay in great numbers, a fact which admits the supposition that capturing them might have been a great resource for the people as long as those animals remained within a moderate distance, but ceased to be so when, frightened by continual pursuit, they retired gradually northward, and sheltered themselves from the Biscayans, along the coasts of Iceland, Greenland, and Newfoundland. At the close of the fifteenth century that people, as well as the inhabitants of Rochelle, Dunkirk, and other ports, which afterwards shared their fortunes, lost this branch of industry, after having possessed it from the twelfth century.

The Northern Whale fishery commenced in the sixteenth century, and was conducted then as it has been ever since. The first enterprise seems to have been conducted by the English in 1594. About the same period the Dutch also first took part in it, and to them it has been a source of wealth almost ever since. They sent to Biscay, for harpooners, and what they called a *spek-snyder*, blubber-cutter, who was also virtually second captain, for on the ship arriving at its destination, he took the command and directed all the operations. This arrangement was a powerful element of success in the early period of these enterprises. The first expeditions were fitted out by companies chartered by the States; but in 1649, the Whale fishery was declared free, and then it rose to its most flourishing condition. Though privileged companies were at first thought requisite, in order to the surmounting of obstacles with which the fortunes of private adventurers might have struggled in vain, the time for abolishing monopolies had arrived. The original difficulties once overcome, private adventures, less cumbersome and less expensive, still further increased profits which were even then immense. The rigorous economy which distinguished them was seen chiefly in the mode of outfit. The hull of the vessel was supplied by its owner, who also took the command; a master sail-maker furnished the sails, a cooper the hogsheads, and so on. This clubbing of interests obviated the inconveniences arising from the smallness of individual capitals, and goes far to account, as a general principle, for the extraordinary rapidity with which the Dutch advanced in wealth, at a time when money was scarce, and banking operations extremely limited. When the vessel returned, each received his own share of the profits in proportion to his contribution, the sailors themselves receiving shares instead of wages. This mode of procedure increased the number of vessels employed tenfold. They amounted at

last to three hundred, manned by ten thousand seamen, sent out in one year.

About the middle of the seventeenth century, when as yet there was abundance of whales on the coasts of Spitzbergen, the Dutch built forts there, and afterwards added establishments for the preparation of oil, amply providing these with boilers and other utensils for that operation. So opulent had the whale-traders become, that a taste for luxury led them to build a town on that desolate island. Houses were actually constructed upon it within eleven degrees of the pole, fitted up with many of the conveniences enjoyed in Holland, in hopes of enabling their inhabitants to brave the rigours of the climate during all seasons of the year. These habitations were originally constructed piecemeal, in the ship-building yards of Amsterdam, and taken to Spitzbergen at a heavy cost, but the project of living there in Winter proved fatal to the lives of many. This town of theirs they called Smeerenberg, and so entirely has it now dispeared, doubtless in part from the combustible nature of its materials, that the very site it occupied can hardly be ascertained; while Batavia, founded by the same people, at the same time, on the island of Java, is now the centre of Indian trade. The idea, however, of the former of these settlements, be it remembered, was suggested, and the sacrifice of the large amount of accumulated profits which it cost, was made, only in prospect of the place becoming an inexhaustible source of wealth. It was at that time the central point of meeting for all the whaling-vessels; there they met, followed by numerous tenders, charged with victuals and stores of all kinds; so that while the fishing was in full activity, there were good inns, well-furnished shops, and many things else to make life agreeable, particularly to strangers. It was only towards the close of the seventeenth century, on the whales retiring about seventy leagues further north, that Spitzbergen was abandoned. Ham, and some other northern towns alone could compete with the Dutch, who, though they abandoned Spitzbergen, continued in possession of the trade until about the middle of the eighteenth century, when the English, after great sacrifices, got it into their own hands, and it seems not unlikely that they in turn will be supplanted by the Americans.

On retiring from Spitzbergen, the whales were still to be found in the northern parts of the icy sea, on the east coast of Greenland, but now they hardly appear even there. They confine themselves almost entirely to the sea, called Baffin's Bay, which connects with the ocean by Davis's Straits. There they are still to be found in vast numbers, but the icebergs, so formidable in those latitudes, make the fishery dangerous.

I AM by all means for encouraging the contemplation of the celestial part of the world, and the shining globes that adorn it, and especially the sun and moon, in order to raise our admiration of the stupendous power and wisdom of Him who was able to frame such immense bodies; and, notwithstanding their vast bulk, and scarce conceivable rapidity, keep them for so many ages constant both to the lines and degrees of their motion, without interfering with one another. And doubtless we ought to return thanks and praises to the Divine goodness for having so placed the sun and moon, and determined the former, or else the earth, to move in particular lines for the good of men and other animals; and how disadvantageous it would have been to the inhabitants of the earth if the luminaries had moved after a different manner. I dare not, however, affirm that the sun, moon, and other celestial bodies were made solely for the use of man; much less presume to prove one system of the world to be true and another false; because the former is better fitted to the convenience of mankind, or the other less suited, or perhaps altogether useless to that end.—BOYLE.

PRESERVATION OF APPLE-TREES.

MANY a time nave I helped to cut away the branches of decaying apple-trees, and to insert healthy grafts in their places; hoping to restore the tree to the sound and fertile state in which it once had been. Revolving seasons did but tend to show that I had completely lost my time; for the American bug, supposed to have been unknown formerly, in this country, attacked my labours in such formidable array, that nothing could withstand its fury.

Every lover of the orchard must have observed this white pestilence in the enclosures sacred to Pomona. It is seen on the branches and on the bole of the apple-tree in the month of June, when it gives them the appearance of being dotted over with little patches of a downy white.

Long ago I turned my thoughts to the extermination of the spoliator, which had nearly rendered the choicest parts of the orchard a sickly, sad, unprofitable waste. I began by trying to make the branches upon which these diminutive harpies had settled, as disagreeable to them as it were possible, hoping by this manœuvre to starve them out of house and home. With this in view, I applied unctuous preparations to the injured parts of the trees; but finding, in the long run, that this availed me nothing, I made a decoction from walnut leaves, and washed the branches well with it, calculating that the bitterness of the decoction would render the favourite food of the insects unpalatable to them. But I was deceived: the bugs continued their depredations as though no pains had been taken to dislodge them.

The application of the spirit of turpentine killed them at once, and for a few days after it had been applied I was in hopes that their extermination had been effected: but others soon appeared.

Despairing of success, I was on the point of quitting the field, and leaving the bugs in undisturbed possession of it, when I began to conjecture that I had not gone the right way to work. I reflected that none of my applications could have penetrated sufficiently deep into the curved and knotty sinuosities of the diseased parts; and that, on this account, there would be a sufficient force of the enemy left alive to recommence its depredations at the first favourable opportunity. Wherefore I concluded that nothing short of the entire destruction of the eggs, the young, and the adult, could save the trees from ultimate ruin. Knowing that the bug could not exist if totally deprived of air, I resolved to bury it alive; I effected this by an application at once the most easy and simple that can be imagined. It costs nothing.

I mixed clay with water, till it was of a consistency that it could be put on the injured parts of the tree, either with a mason's trowel, or with a painter's brush. I then applied it to the diseased places of the tree, and it soon smothered every bug. A second coat upon the first filled up every crack which showed itself when the clay had become dry; and this resisted, for a sufficient length of time, the effects both of sun and rain. The sickly parts, now effectually freed from the enemy which had been preying upon their vitals, were placed in a state to be cured by the healing process of nature; and that nature has done her duty, my apple trees amply testify.—WATERTON.

WHAT a chain of evils does that man prepare for himself who is a slave to anger! He is the murderer of his own soul, yea to the letter he is so, for he lives in a continual torment. He is devoured by an inward fire, and his body partakes of his sufferings. Terror reigns around him, every one dreads lest the most innocent, the most trifling occurrence, may give him a pretext for quarrel, or rouse him into fury. A passionate man is alike odious to God and man, and is insupportable even to himself.—ST. EPHRAIM; *Book of the Fathers.*

ALL the performances of human art, at which we look with praise or wonder, are instances of the resistless force of perseverance; it is by this that the quarry becomes a pyramid, and that distant countries are united by canals. If a man was to compare the effect of a single stroke of a pickaxe, or of one impression of the spade, with the general design and last result, he would be overwhelmed by the sense of their disproportion; yet those petty operations incessantly continued, in time surmount the greatest difficulties, and mountains are levelled, and oceans bounded, by the slender force of human beings.—JOHNSON.

CHAPTERS ON CORONATIONS. No. I.

INVESTITURE OF A VASSAL KING OF PERSIA.

THE ORIGIN OF CORONATIONS.

THE ceremony of the Coronation is not to be regarded simply as a splendid spectacle, and an imposing form; it is a solemn recognition of the mutual obligations between the sovereign and the subjects, made in the presence of that Almighty Being "by whom alone kings do reign." When God selected Saul to be the first king over his chosen people, we find that "Samuel took a vial of oil, and poured it upon his head, and kissed him, and said, Is it not because the Lord hath anointed thee to be captain over his inheritance?" (1 Sam. x. 1.) From that period, the unction, or anointing with oil, became an important part of the ceremonials used at the installation of kings in Judah and Israel. St. Augustine expressly assures us that this custom was peculiar to the Jews: "Nowhere else," he says, "were kings anointed, than in that kingdom where Christ was foretold, and whence he was to come." The ceremony of Saul's inauguration was a simple recognition: "Samuel said to all the people, See ye him whom the Lord hath chosen, that there is none like him among all the people? And all the people shouted, and said, God save the king." (1 Sam. x. 24.) The ceremonies used at the coronation of David were also unction and recognition, and the forms were used when Solomon was made king, during the life-time of his father. But when Jehoash, being saved from Athaliah's massacre, was anointed king by Jehoiada, we find that several additional forms were used, which deserve attention. "Jehoiada brought forth the king's son, and put the crown upon his head, and gave him the testimony; and they made him king, and anointed him; and they clapped their hands and said, God save the king."

The crown appears to have been taken as a royal ornament, because the circle was regarded as the symbol of completeness and perfection; for the same reason, investiture by the ring was used at a much earlier period: it was by this form that Pharaoh constituted Joseph his viceroy over Egypt. A circlet for the head was used at a very early period in Persia, and probably in Babylonia; but most of the other Asiatic nations adopted the tiara, or fillet, which was bound round the king's head, on his accession, with great solemnity. The Persian received the crown, or, perhaps, we should rather call it the royal circlet, from the hands of the Chief Mobed, or High Priest; but the kings who were vassals to the Persian monarch received this emblem of their royal dignity from the sovereign himself. In the annexed engraving we see one of those vassal princes receiving the regal circlet from the hands of the Persian monarch, who claimed for himself the title of king of kings. The queen also was crowned by the king, and not by a mobed: thus, we read in the Book of Esther, "The king loved Esther above all the women, and she obtained grace and favour in his sight, more than all the virgins; so that he set the royal crown upon her head, and made her queen instead of Vashti." (Esther ii. 17.) We learn, also, from the next verse, that the ceremony of the coronation in Persia was celebrated by a public entertainment, and by various acts of grace and favour. "The king made a great feast unto all his princes and his servants, even Esther's feast; and he made a release to the provinces, and gave gifts, according to the state of the king." (Esther ii. 18.)

The Roman title of emperor originally signified nothing more than commander of an army, and was regarded as inferior to that of king. It will be remembered that Julius Cæsar refused to accept a crown; Mark Antony, in his oration over Cæsar's body, is represented as declaring—

> You all did see that on the Lupercal,
> I thrice presented him a kingly crown,
> Which he did thrice refuse.

In the Western empire, indeed, there seems to have been no established form for the installation of the sovereign; but in the Eastern or Byzantine empire the Roman customs were intermingled with those of the Oriental nations, and the emperors received from the prætorian guards a crown and a sword, which seemed to be a tacit acknowledgment of the right claimed by the soldiers to dispose of the empire. Justin II. deprived the imperial guards of this privilege, under the pretence of giving a religious sanction to the ceremonies of the coronation; and from his time the crown, sceptre, and sword, were publicly given to the emperor by the patriarch of Constantinople, in the church of St. Sophia. The ceremony of anointing was first introduced by Andronicus the Younger, in the thirteenth century, long after it had been adopted in Western Europe; he added this form in order that the soldiers should not revive their claim to perform the coronation, because

that unction and chrism, that is, anointing with oil and ointment, could only be performed by a person of episcopal dignity. The empresses of Constantinople, like the queens of Persia, however, could only receive the crown matrimonial from the hands of the emperor.

The warlike tribes of Germany elected their kings, but they always chose one of royal blood for their sovereign. Indeed, the principles of hereditary and elective monarchy, which now appear so utterly irreconcileable, were so far from seeming inconsistent to our Saxon ancestors, that they insisted on both being united in the person of their monarch, and some traces of this apparent anomaly may be found in the present ceremonials of coronation.

ELEVATION OF AN ANCIENT GERMAN KING.

When the Germans had chosen a king, they prepared a *pavis*, or very large shield, on which they seated the new monarch; and elevating the pavis on the shoulders of the principal officers, carried their king in triumphal procession three times round the army. On these occasions, the Germans used to manifest their spirit of rude independence by playing practical jokes on their sovereign, such as shaking the pavis, and attempting to unseat him. Such barbarous sport had nearly proved fatal to Gunwald, king of Burgundy: he was thrown from the shield, as he was borne round the army a third time, and was so severely bruised that it was feared he would have expired upon the spot. This custom was introduced into England by the Saxons, and it is still preserved in the chairing of successful candidates after elections. Even the spirit of practical jesting was preserved down to the beginning of the present century: within the memory of persons still alive, it was considered rather hazardous to encounter the perils of a popular chairing at Yarmouth or at Norwich.

This custom of elevating the sovereign on a shield, was introduced into the Roman empire a little before its fall; Gordian and Julian were thus proclaimed emperors by their soldiers, who had learned the practice during their campaigns in Germany and Gaul. This custom was also adopted in the Byzantine empire. Cantacuzenus informs us that the emperor was to be elevated on the shield at sunrise; that the fore-part of the shield was to be supported by the emperor's father, if he were alive, and if not, by his nearest male relation; and that the back part was to be borne by the patriarch of Constantinople, and the principal nobles. In this state the emperor was conveyed to the church of St. Sophia, where he was invested with the ensigns of imperial dignity.

In Navarre, the ceremony of elevating the sovereign on the shield was considered of greater importance than the coronation itself. The arms of the kingdom were painted on a shield, which was placed upon the ground in some public place; the king, led by two of the principal nobles, advanced and stepped upon the shield, when it was raised up by six stout slaves, and the monarch was borne in this fashion into the midst of the assembled multitude.

In an ancient law of Don Pelayo, one of the Gothic kings of Spain, we find the following directions for the creation of their kings: "Let the king be chosen and admitted into the metropolitan city of this kingdom, or at least into some cathedral church, and the night before he is exalted, let him watch all night in the church; and the next day, when they come to lift him up, let him step upon a shield or buckler, and the principal men there present shall raise him aloft, and when he is so elevated, the people shall cry, *Real, Real.*"

Among the Jews, the Norwegians, and the Irish, the ceremony of investing the monarch with sovereign power was performed near or at some remarkable stone pillar. Thus Abimelech was made king "by the plain of the pillar that was in Shechem." (Judges ix. 6.) Jehoash, during his coronation, "stood by a pillar, as the manner was," (2 Kings xi. 14;) and Josiah, when he restored the pure worship of Jehovah, "stood by a pillar, and made a covenant before the Lord." (2 Kings xxiii. 3.)

The Norwegians and Danes used to place twelve stone seats in the form of a circle, for the principal nobles, and one in the centre for the king. The royal stone was of great size, and was rudely shaped into the form of a seat. Three of these circles still exist in Denmark, which was anciently divided into three kingdoms: the most perfect of them is that called *Kingstolen* (the royal seat), at Leipa in Zealand; the others are at Lunden in Scania, and Viburg in Jutland.

These stone circles for the installation of kings were introduced into the Shetland Isles, the Hebrides, and the Isle of Man, by their Norwegian conquerors. They were called *Tings*, and the hill on which the stone circle in the Isle of Man was erected, is still called Tinwald Hill.

The Germans adopted this custom from the Norwegians: their *Königstuhl* is near Coblentz upon the Rhine; it consists of seven stone seats ranged in a circle, for the seven electors, and a large stone in the centre for the emperors. In Hungary, the kings took their coronation oath on a stone column. After the monarch had sworn, he mounted a spirited horse, and leaped over a mound of earth prepared for the purpose, after which he ascended the mound, and waved his sword in the form of a cross over the multitude.

The most singular ceremony connected with the stone column was that which took place at the installation of the dukes of Carinthia. A large rock near the city of St. Veit was the place where the installation was performed. On the day appointed for the celebration of the ceremonial, a peasant, who claimed the place by hereditary descent, took up his position on the top of the rock, and had below him, tethered at the base, a black cow, a black calf, and the leanest mare which could be found in the province. A little after sunrise, the duke-elect came out from the city, clad in a peasant's dress, a coarse bonnet on his head, buskins of untanned

leather on his legs, and a shepherd's crook in his hand; but though thus plainly dressed, he was attended by his senators and nobles in their richest robes. When the procession approached, the peasant called out, "Who is this that cometh hither with so much parade and magnificence?" The attendants replied, "This is the prince who claims, as rightful heir, the inheritance of the sovereignty over our good land, the province of Carinthia." The peasant then inquired, "Is he just? Doth he seek the welfare of the Carinthian peasants? Is he of free condition and noble birth? Is he worthy of honour for his past conduct, and doth he desire to win honour by future exploits? Is he obedient to the laws, and attached to the ancient usages of Carinthia? Will he be a defender of the pure and holy Catholic faith?" To this the duke's attendants replied, "Such is he, and such he will be." After a long pause, the peasant renewed the conversation by asking, "Has the lord any right to remove me from this my place?" To which question the attendants replied, "Our lord hath purchased this ground for sixty deniers, and he granteth to thee the animals thou hast with thee, the robes which he wears, and immunity of taxes for thyself and thine house." The peasant then descended from the rock, and gave the duke a slight slap in the face. The duke then mounted the rock, and brandished a sword in the form of a cross over the multitude; water was then brought to him in the crown of a peasant's cap, which he drank as a symbol both of his moderation and humility. The duke then laid aside his peasant's dress, and having received his ducal robes, went and received the sacrament in the church of St. Veit.

The stone on which the ancient monarchs of Ireland were inaugurated, was at a very early period removed to Scotland, whence it was brought to England by Edward I.: it is now fixed in the seat of the coronation-chair, and we shall describe it more particularly in a future chapter.

It only now remains to mention, that the recognition, in the German forms of coronation, was always connected with the semblance of an election, as we find from the speech made by the archbishop of Cologne, when he presented Otho, who was designated emperor during the life-time of his father, to the general assembly of the German princes: "Behold, I bring you here Otho, chosen by God, and appointed by his father, Henry our lord, and now made king by all the princes of the empire. If this election please you, do you signify the same by holding up your hands to heaven." The people consenting, he was then anointed, and invested with the imperial ensigns.

ON EMPLOYMENTS WHICH INJURE THE EYE-SIGHT

No. IV.

HABITUAL USE OF GLASSES — ADJUSTMENT OF GLASSES TO VARIOUS QUALITIES OF SIGHT — NEAR-SIGHTEDNESS — LONG-SIGHTEDNESS.

THE class of persons whose sight is affected by the habitual use of glasses, comprehends a very large number of professions, and presents to the scientific mind points of high interest, while to the general reader the subject is one of paramount importance, as it determines how far the eye is affected beneficially or otherwise by the employment of optical glasses of every description, whether it be the quizzing-glass which the tyrant Fashion imposes on her votary, the sextant of the skilful navigator, or the reflecting telescope of the profound astronomer. The convex spectacle-glasses of the flattened eye of age, and the concave lens of the too convex eye of youth, are alike subjects of import which we propose briefly to consider.

But first it is necessary to remind the reader of the problems connected with vision by which the eye takes cognizance of very distant objects, and has also a distinct appreciation of those within a few inches. It is known that a telescope, microscope, camera obscura, &c., all require to be adjusted before they can be employed, and that this adjustment must vary according as they assist the eye to view near or remote objects: hence the question how is the eye adjusted, or does it require adjustment at all? This question we will answer as fully as the present state of our knowledge of the subject extends.

In the usual state of the eye it is so adjusted, by means of a power of which we are ignorant, as to perceive clearly objects at a very great distance; that is, the crystalline lens is placed as far back as the ciliary process will allow it to go, and in that position, parallel or nearly parallel rays meet in a focus on the retina. If from the distant object we look at something less remote, say a tower a quarter of a mile distant, the crystalline lens is brought slightly forward, in order that the increased path between it and the retina may correspond with the increased divergency of the rays proceeding from the latter object.

Suppose the eye be directed successively to several objects placed at various distances, such as a hill, a tower, a house, a tree, and a man, at the respective distances of ten, five, two, one, and one-half miles. Now it is supposed by some that the healthy eye is adjusted once for all to very remote objects when it is in a state of perfect repose, and consequently that it has a clear view of these objects at different distances without a new adjustment for each. Others, again suppose that the distance between the crystalline lens and the retina is precisely proportioned to each of these distances. Suppose then that such is the case, and that we are ignorant of what these distances really are, we must be altogether unable by any act of the will to adjust the lens. It must, therefore, according to this hypothesis, be adjusted, and that with mathematical precision, by involuntary action, since, in order to get a clear view of those five objects, the lens must be at five different distances from the retina. This we think impossible.

Now the motive power of the lens, the adjusting screw in short, by which it is advanced or sent back, is thought to be the iris, which by its self-acting adjustment to light, influences the motions of the lens, with which it is connected through the medium of the ciliary apparatus, so that when the eye is transferred from the view of a near to a distant object, and *vice versâ*, the pupil undergoes a change, which in its turn effects a change in the position of the crystalline lens, as a necessary consequence. The iris is connected to nerves possessing a high degree of irritability, and it is possible that the stimulant property of light is sufficient, independently of the will, to produce the variations in its diameter, according as the light is abundant or not; but it appears that for short distances the iris has the power of voluntary adjustment, that is, when near objects are to be seen, the crystalline lens is drawn forward by a voluntary action, but we are ignorant of the extent of this voluntary power; and it remains to be shown whether the iris undergoes a change, and consequently the crystalline lens, by the stimulus of light or otherwise, when the eye is transferred from one distant object to another distant object, whose dis-

tance however from the eye is less than that of the first: it seems most likely, that by a combination of voluntary and involuntary actions, the eye is accommodated to varying distances, and that the stimulus of light falling on the iris, or retina, or both, is the main cause of the adjustment of the eye.

Let us now consider a near-sighted eye, or one in which the crystalline lens is too spherical, by which the rays are converged too soon, and cross each other before they reach the retina. Now suppose such an eye is regarding a very distant object, and that the lens is then as far back as it can go, but not far enough back, in order that the focus may attain the retina, the remedy then is, supposing the eye to be otherwise healthy, a concave lens, by means of which the convergency of the rays is delayed, and by a nice adaptation the concavity of the artificial lens may so correct the too great convexity of the crystalline lens, that the foci fall exactly on the retina. Much injury, however, is done to the eye by employing bad glasses, or such as are too concave; the rule is, select such glasses as do not diminish objects seen through them; if they do so they are too concave, and the crystalline lens is brought too near to the pupil, by which means the ciliary muscles are fatigued by too rigid contractions.

Between the age of thirty and fifty, the eyes of most persons begin to experience a remarkable change, which generally shows itself in a difficulty of reading small type or ill-printed books, particularly with candlelight. This defect of sight, which is called long-sightedness, because objects are seen best at a distance, arises from a change in the state of the crystalline lens, by which its density and refractive power, as well as its form, are altered. It frequently begins at the margin of the lens, and takes several months to go round it, and it is often accompanied by a partial separation of the laminæ, and even of the fibres of the lens.

If the human eye (as Sir David Brewster remarks,) is not managed with peculiar care at this period, the change in the condition of the lens often runs into cataract, or terminates in a derangement of fibres, which, though not indicated by white opacity, occasions imperfections of vision that are often mistaken for amaurosis and other diseases. A skilful oculist, who thoroughly understands the structure of the eye, and all its optical functions, would have no difficulty, by means of nice experiments, in detecting the very portion of the lens where this change has taken place, in determining the nature and magnitude of the change which is going on, in applying the proper remedies for stopping its progress, and in ascertaining whether it has advanced to such a state, that aid can be obtained from convex or concave lenses. In such cases, lenses are often resorted to before the crystalline lens has suffered an uniform change of figure or of density, and the use of them cannot fail to aggravate the very evils which they are intended to remedy. In diseases of the lens, where the separation of fibres is confined to small spots, and is yet of such magnitude as to give separate coloured images of a luminous object, or irregular halos of light, it is often necessary to limit the aperture of the spectacles, so as to allow the vision to be performed by the good part of the crystalline lens.—Brewster's *Optics*.

. . . . . This I hold
A secret worth its weight in gold
To those who write as I write now,
Not to mind where they go, or how,
Through ditch, through bog, o'er hedge, and stile,
Make it but worth the reader's while;
And keep a passage fair and plain
Always to bring him back again.—Church'll.

"You may run from major to minor," says Mrs. Bray in one of her letters to Dr. Southey, "and through a thousand changes, so long as you fall into the subject at last, and bring back the ear to the right key at the close."

THE USEFUL ARTS. No. XXXVII.

The Carpenter and the Joiner, *concluded*.

The first and principal tools used by both carpenter and joiner, are *saws*, of different sizes, for reducing the rough wood to the size adapted for the purpose to which it is to be applied. Small, fine-toothed saws, both long and thin blades, termed spring-saws, are used for cutting out small holes in wood, and for analogous purposes, when precision and nicety are required; these spring-saws are sometimes mounted in a frame on the same principle as that of the stone-mason's saw, formerly described but commonly, the blade of the saw, of whatever size it may be, is only fixed on a convenient handle, so that the whole blade of the saw may pass through the fissure it makes in the material. All saws are made of the best steel, highly tempered, so as to recover their form if bent by the resistance of the wood.

Next to the saws and planes, *chisels* are the most indispensable tool to the carpenter. These *chisels* are of different widths, adapted to different uses, and are not only used with a hammer or mallet, as the mason employs them, but simply as cutting-tools, used by hand for finishing the re-entering angles of mortise-holes, or for finishing the ends of pieces of wood too small to be planed.

The carpenter employs *gimlets* for making holes for screws and nails. The gimlet is a short rod of steel, finished at one end into a sharp-pointed screw of one or two turns only, which, acting on the principle of that mechanical power, compels the tool to sink deeper and deeper into the wood, as the tool is turned round; and to enable the workman to turn the gimlet, it is fixed into a cross handle, which, acting as a lever, allows of the friction of the tool being overcome. Just above the screw point, the rod or shaft of the gimlet is *fluted* or hollowed out; the sharp edges of this fluted part cut the hole made by the screw-end larger and smoother, and the hollow receives the chips or shavings cut off, and prevents them from clogging the hole and stopping the progress of the tool.

Augers are large tools shaped like a gimlet, and, acting in the same manner, are employed for making large holes for bolts, spikes, &c. *Centre-bits* are steel tools of different shapes, made to fit into a bent handle something like the letter G, which, acting as a lever, allows of the tool being turned round and round by one hand, while by the other the workman holds the top of the handle steady and vertically over the point of the tool. Some of the *bits* or tools are for cutting out cylindrical holes, and are shaped at the cutting-edge like a chisel, with a small point projecting from the centre of the edge, on which the instrument turns in the wood and acts on the principle of a lathe. On each side this point, the chisel-edge is bent sideways in opposite directions, to allow of its *ploughing* up the wood before it with greater efficacy than it would do if it were not so formed.

The *brad-awl*, or *nail-piercer*, is a short steel wire, sharpened at the point into a flat chisel-edge, and put into a plain turned handle. This edge being pushed into the wood, and the handle turned round, the tool divides the fibre, and makes its way on the simple principle of a wedge, and does not cut away or remove any portion of the material as the above-described tools do.

The carpenter uses nails and screws to fasten the different parts of his work together, and it is necessary to make a hole to receive them before they are driven in, or else the wood would split by the action of forcing the nail or screw into the solid material, and, indeed, it would be impossible to force a screw into the solid wood at all.

The screw is forced into the wood by being turned round and round by means of a blunt chisel called a *screw-driver*, the edge of which is inserted into a notch cut in the head of the screw to receive it.

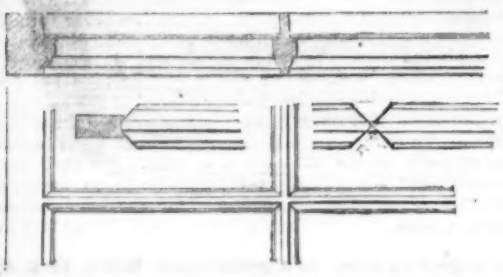
Joiners fasten one piece of their work to another by *glue* made by boiling down refuse animal matter containing the animal principle called *gelatine* in abundance, such as hoofs, horns, tendons, skin, gristle, &c.: it is a property of gelatine to dissolve in hot water, and to harden again when cold, and the water evaporates. Accordingly the glue, which is only concentrated impure gelatine, is dissolved by heat in a small quantity of water, and being applied to the clean faces of the wood to be united, by a coarse brush: these faces are closely pressed and retained together till the water evaporates, when such is the tenacity of the glue, that the wood may be broken in another place as easily as at the glued joint. To enable, glue, however, to act in this manner well, the wood should be clean, the parts to be glued

well warmed before the glue is applied, and the joint should be close, or the parts accurately brought together.

Besides the before-mentioned tools and materials, and some others, such as hammers, axes, &c., which need not be described, carpenters and joiners use instruments for measuring and setting out their work, and for drawing on the surface of the material the forms into which it is to be reduced, or the shape and situations of portions of the material to be removed for the purposes of framing. The instruments are compasses, squares, rules, levels, plumb-lines, and so on, common to all trades which form materials into artificial geometrical shapes: and, like the mason, the carpenter and joiner must be conversant with the more elementary problems of practical geometry.

Having described the principal tools used by this workman, we will return to the work performed by him, and in illustration of the subject, point out the mode of proceeding in making a window-sash, which is one of the most delicate operations in common joiner's-work. The outer part of the sash is made broader and stronger than the intermediate cross-bars which receive the panes of glass, in order to give strength and rigidity to the sash. This outer part is framed together at the four angles by mortises and tenons, the latter coming quite through the stuff, and having a small sharp wedge driven into the middle of the tenon when inserted into the mortise: by means of this wedge, the tenon is expanded at its end into a wedge-shaped form, by which it fits more tightly into the mortise and is retained in its place, the wedge-shape not allowing the tenon to be withdrawn again. But it may be here remarked that, besides this precaution, all small mortises and tenons are put together with glue to ensure the stability of the joint.

The inner edge of this frame is formed by a plane into the half moulding, of which the cross-bars present the entire section, so that when the sash is completed, each panel, as it were, which is filled in with the glass, is surrounded on its sides by a continuous moulding, and on the other side of the frame each panel presents a *rebate* in which the glass lies. The annexed figure of the section of part of the outer frame and one cross-bar, will make this clear.



The cross-bars are made in lengths out of slips of wood, by a plane, which first forms the mouldings and rebate on one side, and then by turning the slip over the same plane, finishes the other with an exact counterpart of the first. These bars are framed into the outer part of the sash by delicate mortises and tenons put together in the manner before described; but it will be seen by reference to the figure, that the moulded part of the bar must unite to that of the outer frame, or of another bar, by a *mitre* joint, that is, by one which allows of the lines of mouldings returning on the second piece, at right angles to their direction on the first, without any interruption to the continuity of the surface.

This and all analogous mitre-joints are formed by planing the ends of the wood to form a face, making an angle of 45° with the axis or length of the stuff, and the joiner is provided with a tool called a *mitre-box*, consisting of a stock or frame, in which the stuff being put, resting against one another's surface, guides the plane so as to cut off the end obliquely at the requisite angle. It is clear that this mitre must be made on both faces of the bar, and therefore the two mitre faces form a wedge-shaped termination by meeting at a right angle, as shown in the last figure. Now as besides the mitre end a tenon is to be left to fit into a mortise in the outer frame, it is clear that the whole must be a very nice piece of workmanship to be executed on so small a material as the thin bar of a modern sash.

The bevelled mitred end of the bar is received into a corresponding shaped notch cut the depth of the half moulding in the outer frame to receive it, and at the bottom of this notch is the fine mortise-hole intended to receive the tenon.

The bars of the sash can, of course, only be made in one length in one direction, and the cross-bars which divide the long panels, formed by these continuous bars, into the sizes of the glass, are made of similar short pieces with mitred ends; but these ends, where they frame into the long bars, have no tenon, the thinness of the stuff not admitting of one, since the cross-bars come, end for end, opposite each other, on the two sides of the upright bars.

It is evident that the long bars must be put together with the outside frame, or else the tenons could not be inserted into the mortises made in this last.

In further explanation of joiners'-work, we will briefly describe the mode of making a drawing-board, requiring to be *true*, *plane*, and *square*. Suppose the board is intended to be so wide as to require three boards side by side to make it: these three boards being sawn out of the right length, their edges are first planed perfectly straight and smooth, so that when any two are placed side by side, the edges touching, those edges may touch or fit together accurately for their whole length; this accuracy of joint is obtained by testing the edge after each time the plane is applied, by a straight-edge, or rule, known to be *true*. There are two modes of proceeding to make these joints firm, one by *dowelling*, that is, by inserting short pieces of hard wood, as oak or wainscot, let for half their length into a mortise cut in the edges of the boards that are to fit together; these mortises being, of course, made opposite each other, these dowels prevent the boards from rising up or starting from their places when the work is finished. Instead of short dowels a strip, the whole length of the boards, is let into each joint, half the strip lying in a ploughed groove, made in the middle of the corresponding edges of the two boards. But, besides these precautions, the joints are well glued up.

There are two modes by which this board may be strengthened, to prevent its *warping* or *casting* by the drying or shrinking of the wood. A cross-piece of deal, or better still of wainscot, is fixed across the ends of the boards, these ends being double rebated or *tongued*, to fit into a groove made in the cross-piece to receive the tongue; these cross-pieces prevent the long boards from warping, since the cross-pieces would have no tendency to alter their figure in the direction of their grain.

If, however, the board be larger, *keying* is better than this clamping. Clamping consists in attaching two stout cross-pieces at the back of the boards, the faces of which pieces are worked so as to fit, and are glued into a dovetail-shaped groove cut across the direction of the boards at their back to receive the keys, as will be understood from the annexed sketch.

When the board is made, and the glued joints quite dry, the face is planed perfectly smooth and level, and the edges made truly square, or at right angles; if the board be keyed, the back must be planed smooth before the keys are put in.

The flooring-boards in the better kinds of houses are often *dowelled* in the manner above described, and the ends of the flooring-boards are tongued and grooved to fit together, to prevent the boards from starting up from the joists and becoming uneven.

THE seven days is by far the most permanent division of time, and the most ancient monument of astronomical knowledge; it was used by the Brahmins in India, with the same denomination used by *us;* and was alike found in the calendars of the Jews, Egyptians, Arabs, and Assyrians. It has survived the fall of empires, and has existed among *all* successive generations; a *proof* of the common origin of mankind. The division of the *year* into months, &c., is very old, and almost universal, but not *so ancient* or uniform as the seven days, or week.—MRS. SOMERVILLE.

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